Better Understanding of Property-Level Supply and Demand For the Cold Storage Sector

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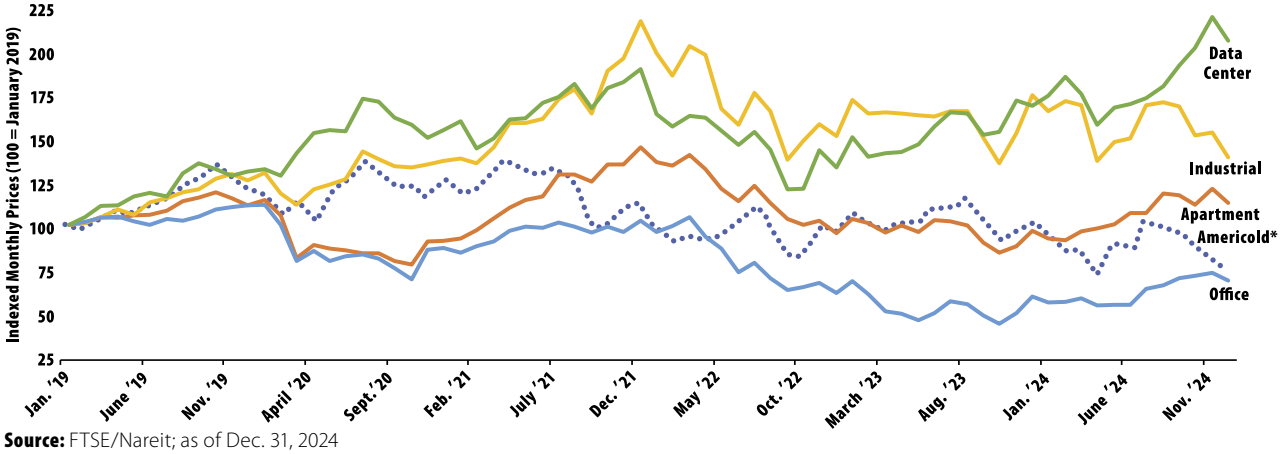
The high-level investment thesis for cold storage is quite straightforward. From a demand perspective, global consumption of refrigerated food products has risen for decades owing to an expanding middle class, more efficient production and transportation, population growth, and evolving tastes. Per capita annual consumption of meat including poultry and seafood worldwide is estimated at nearly 62 pounds and forecast to grow by 1.8% annually from 2023 to 2033.[1] However, from a supply point of view, modern cold storage facilities are expensive and difficult to build, maintain, and operate, which is why the average age of a refrigerated warehouse in the US is more than 20 years. Such favorable supply-and-demand fundamentals have attracted significant investor interest to this property sector.

Yet the recent performance of the cold storage property sector has been quite underwhelming. Exhibit 1 shows public market data because private market real estate data for cold storage is currently too limited. Using Americold as a proxy for refrigerated warehouses, the chart shows that cold storage has underperformed other property types by a wide margin. Specifically, Americold's share price performance—down by 37.0% cumulatively from January 2019 to December 2024—was only modestly better than the beleaguered office sector, which was down 41.7%. Cold storage returned 65.7% below conventional warehouse REITs' returns. When compared with data center, another alternative real estate sector that is capital intensive and temperature controlled, Americold has underperformed by 132.7% cumulatively.

Admittedly, such a comparison has several caveats. For example, cold storage is operationally intensive, and the costs of running a refrigerated warehouse can be four times that of a conventional one with a far greater range of custom user requirements. Still, other operationally intensive property sectors, such as data center, have performed well. In addition, a single REIT is not an appropriate property sector benchmark, because the idiosyncratic aspects of a publicly traded firm overwhelm any price signals from property fundamentals. The point is that even given sizable structural demand tailwinds, the downside risk in sector investment should not be underestimated.

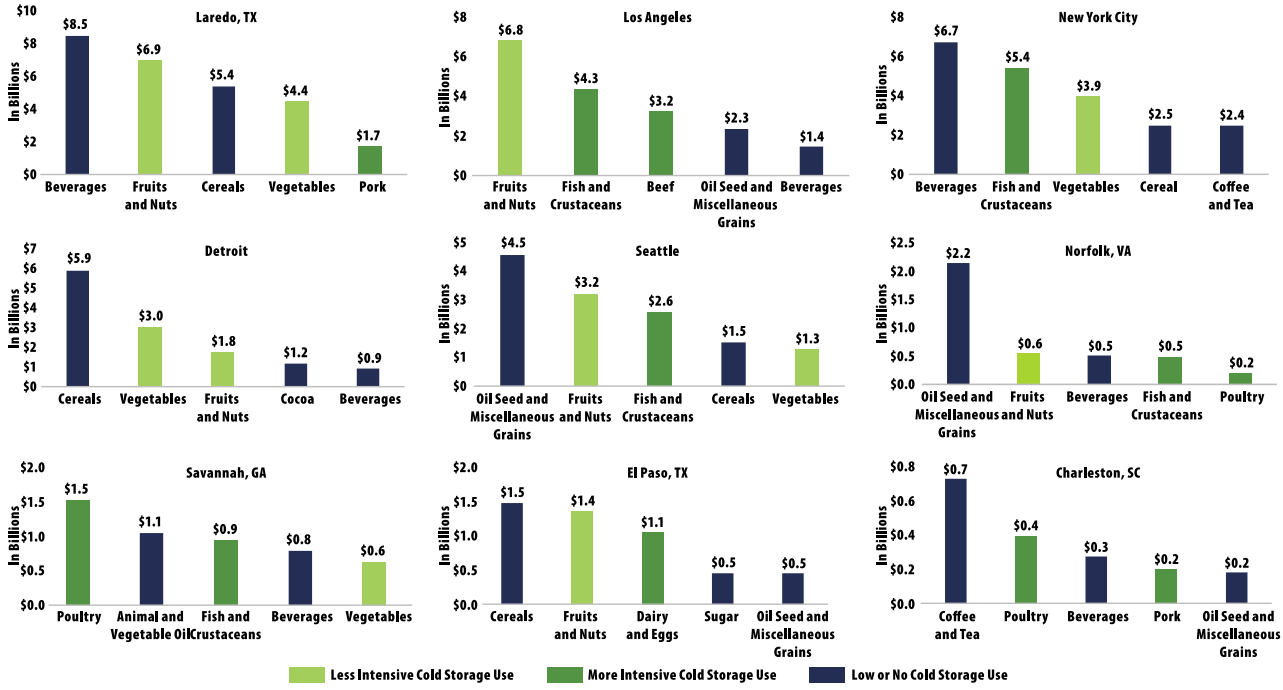
1. University of Oxford, Global Change Data Lab; as of December 2024.

Exhibit 1: Indexed REIT Share Prices by Property Type



Source: FTSE/Nareit; as of Dec. 31, 2024
*Americold is used as a proxy for refrigerated warehouses.

Exhibit 2: Key Food and Beverage–Related Imports and Exports for Select Large Port Districts (Fiscal Year 2023)



Source: Census Bureau UTO; Fiscal Year 2023

Cold storage operations represent a significant component of facility revenue; 85% of modern refrigerated warehouse occupancy was taken up by third-party logistics firms as of 2023, ensuring that the offering and execution of services such as pallet handling, blast freezing, and Food and Drug Administration packaging is critical to maintaining the stability of property-level revenue streams. But what about location? Operations can be improved, but the investment impact of a poorly located facility is much harder to rectify. Because of the operationally intensive nature of the property sector, facilities should be situated well within the network of refrigerated-goods supply chains. Importantly, these supply chains are necessarily characterized by greater redundancy and resilience than those involved in the transporting of dry goods. Goods requiring temperature-controlled environments, including fruits, vegetables, meat, poultry, shellfish, and even certain types of nuts, must also reach their destinations within strict time frames to prevent spoilage, which could lead to contamination and/or food waste. Pharmaceutical products such as vaccines require even more stringent standards of storage and transport.

Much of the real estate research done by investment managers is centered around the geographical concept of the metropolitan statistical area (MSA). Ranking MSAs by certain macro variables, including population, employment, household incomes, and property fundamentals, is a useful exercise when selecting "target" geographies as part of managing and growing a portfolio of diversified real estate holdings. Further, partitioning MSAs into submarkets allows more granular geographical comparisons. For cold storage, however, MSA and submarket analysis alone is insufficient, not to mention that property data for the alternatives sector is difficult to come by relative to the more established property types. One of the ways of mitigating the analytical limitations created by data opacity is incorporating analysis around the flow of goods, specifically refrigerated goods, as a critical component of demand.

Demand: Tracking the Flow of Refrigerated Goods

A wealth of publicly available resources, including the US Department of Agriculture, the Bureau of Transportation Statistics, and the Census Bureau's USA

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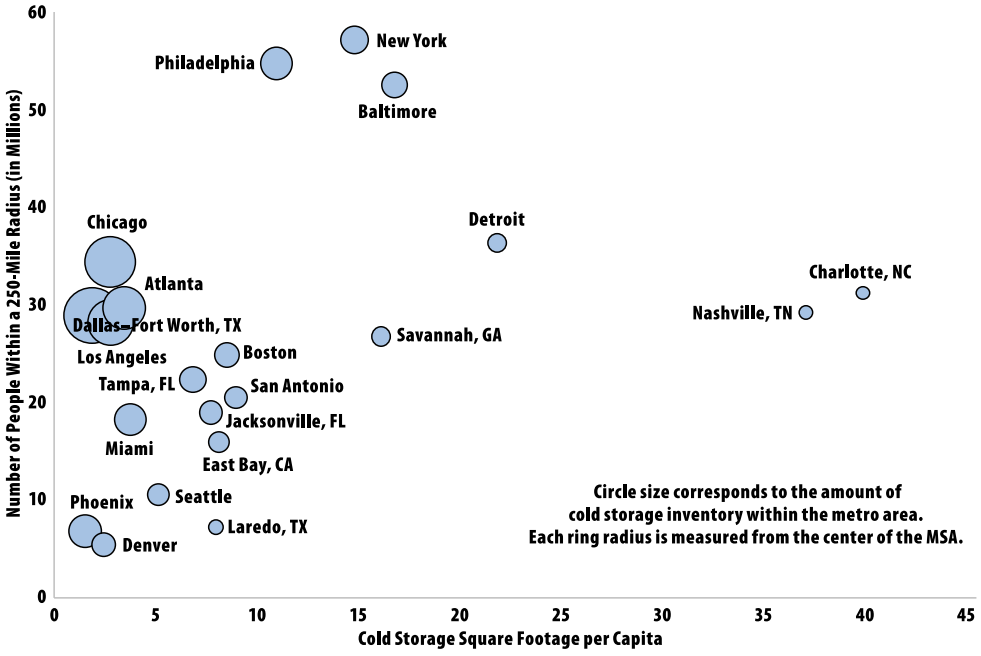
Exhibit 3: Size of Cold Storage Market Versus Cold Storage Square Footage per Capita



Sources: CoStar, Census Bureau, StatsAmerica.org; as of 2Q2024

Trade Online (UTO) data portal, offers time series data on the volume and value of goods that flow across the US border and between population centers. Ports of entry, whether coastal or land based, are critical nodes for refrigerated goods supply chains (Exhibit 2). These geographies should be regarded as prime locations for cold storage investment, even as disruption will result from elevated tensions and tariffs between the US and its major trade partners. However, depending on the type of tariffs, understanding the mix of goods from which countries come through a given port will help identify the ports that may be better positioned relative to others in the coming years.

Supply chains have also been evolving in recent years. In particular, the disruption caused by emergency COVID-19 restrictions exposed the weaknesses of modern-day supply chains. Inadequate geographical and sourcing diversity exposed their lack of resiliency and redundancy. Before the pandemic, supply chains were overly tilted toward speed of delivery and efficiency of costs. Afterward, suppliers and producers worked to diversify their transportation modalities rather than favoring a single path. In 2024, the longshoreman strike involving East and Gulf Coast ports and drought conditions that slowed container ship passage through the Panama Canal further underscored the principle that supply chain optimization was not simply about minimizing costs but about incorporating flexibility to deal with a myriad of potential disruptions.

Significant amounts of refrigerated goods flow through large coastal ports including Los Angeles; Long Beach, CA; New York; and Seattle, according to data available through UTO. Ports such as Laredo, TX; El Paso, TX; and Savannah, GA, are much smaller MSAs, each with populations well under one million—yet a disproportionately significant volume of goods passes through these ports. In fact, intensity of cold storage usage through some of these ports is proportionately greater than that of large ports. For example, two of the five primary food and beverage categories for both Savannah and Charleston, SC, relate to meat, poultry, fish, and shellfish, which represent more robust uses of cold storage than fruits and vegetables.

Supply: Measuring Cold Storage per Capita

A flow-of-goods assessment of demand should be accompanied by a relevant analysis of cold storage supply. Supply measurements employ the cold storage inventory per capita using a ring radius of 150 to 250 miles—the standard daily round-trip distance for short-haul trucking. As with demand, cold storage supply analysis should not be limited simply to the geographic boundaries of the MSA. The relevant question is, How many consumers could a refrigerated warehouse theoretically service within a day's drive? Exhibit 3 measures the 250-mile ring radii from the center of select MSAs.

Exhibit 4: Cold Storage Supply-and-Demand Factors

Primary Cold Storage Demand Factors	Primary Cold Storage Supply Factors
Population Density / Consumption	Average Age and Attributes of Stock
Transportation Accessibility	Planned, Underway Projects
Trade Composition, Flows Including Intermodal Activity	Facility Service Offerings (e.g., Blast Freezing, Automation)
Refrigerated Warehouse Property Metrics	Utility, Wage Costs by MSA
Online Grocery, Health Care / Pharma Uses	Labor Force Within 30-Minute Rush-Hour Drive Time

The aggregation of cold storage inventory is done at the property level, running queries through CoStar's data platform. Broker data along with selective web scraping can further augment the inventory picture, but property-level data for the cold storage sector is admittedly sparse. Exhibit 3 depicts these parameters, with the size of the scatter plots corresponding to the estimated level of inventory, showing that the square footage of refrigerated warehouse per capita within the ring radii encompassing Chicago, Atlanta, and Dallas–Fort Worth, TX, is still relatively low despite their large concentrations of cold storage inventory. On the other hand, Charlotte, NC, and Nashville, TN, could be oversupplied. Baltimore, New York, and Philadelphia do not appear oversupplied, although the size of these cold storage markets might be underestimated as well. Furthermore, a 250-mile ring radius likely overstates the reach of short-haul trucking in the heavily congested Northeast.

The Importance of a Better Analytical Framework

For both investors and operators, investing in the cold storage sector requires patience and a better analytical framework than traditional MSA-based analysis. For example, the cold storage REIT Lineage went public in July 2024, but by December, its share price was 34% lower. In its third-quarter earnings call, Lineage's senior team cited impacts from inflation, tighter financial conditions, and a pullback in consumer nondurable goods spending. Yet these were conditions that impacted the whole of the US economy.

Another consideration is that new deliveries of refrigerated warehouses can take time to absorb because supplier switching costs can be high, especially in an environment in which operating costs have accelerated compared with revenues.

The treatment of supply and demand outlined in this article is cursory but acknowledges that refrigerated warehouse fundamentals need a different analytical framework relative to other traditional property types. Exhibit 4 highlights the primary demand-and-supply factors we believe are necessary for a manageably comprehensive investment decision in this sector. ■

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